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Case report

An uncommon case of a pyelogenic cyst containing two calculi

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Abstract. *Background and Aim:* This case describes a rare and complicated pyelogenic cyst in a 32-year-old female who presented with intermittent right flank pain and mild dysuria for six months. Although pyelogenic cysts are typically asymptomatic, the presence of lithiasis significantly complicates both the diagnosis and management. *Methods:* Imaging studies, including ultrasound and contrast-enhanced CT, revealed a calyceal diverticulum located in the mid-calyceal region of the right kidney. *Results:* This cyst is complicated, as it contains two calculi and communicates with the renal collecting system. *Conclusions:* Conservative treatment may be effective for less symptomatic patients; however, recurring symptoms or complications may demand procedures such as lithotripsy or surgical resection. This case underscores the rarity of such presentations and highlights the crucial role of radiological evaluation in guiding clinical management. (www.actabiomedica.it)

Key words: pyleogenic cyst, lithiasis, calyceal diverticulum, diagnostic procedure, US, CT

Introduction

A pyelogenic cyst (PC) is a rare, benign, congenital anomaly that arises from the renal collecting system. These cysts are generally considered to be a result of abnormal development during embryogenesis, specifically the failure of the renal collecting ducts to differentiate properly. Pyelogenic cysts are most commonly located in the renal pelvis or calyceal regions, often presenting as solitary, simple cysts (1). While these lesions are frequently asymptomatic and may be discovered incidentally during imaging studies for unrelated conditions, complications can arise, including infection, hemorrhage, or the development of calculi (stones) within the cyst. The presence of calculi within a pyelogenic cyst is considered an uncommon but significant complication since it can cause symptoms such as flank discomfort, hematuria, or dysuria, complicating the diagnosis and treatment of the problem. Moreover, the formation of stones within the cyst may predispose the patient to recurrent urinary tract infections or even obstructive uropathy if left untreated. This case describes a relatively rare and complex pyelogenic cyst in which two calculi were discovered within the cystic cavity, greatly complicating the clinical presentation and necessitating thorough radiological evaluation and therapy. The combination of a pyelogenic cyst with stones, particularly when the cyst communicates with the renal collecting system, is extremely uncommon and poses diagnostic challenges, as it can mimic other renal pathologies such as a calyceal diverticulum or chronic pyelonephritis (2).

Case Report

A patient, a 32-year-old female, presented at the Emergency Department with a clinical history of intermittent right-sided flank pain and mild dysuria lasting for approximately six months. Despite

undergoing conservative management, including analgesics and increased fluid intake, her symptoms persisted, prompting further investigation. The patient described intermittent, dull flank pain that worsened with certain movements or prolonged sitting. She also experienced occasional dysuria, but without hematuria or fever. There was no history of urinary tract infections, renal stones, or other renal disorders, nor any systemic conditions like diabetes or hypertension. The patient did not report weight loss, night sweats, or changes in urinary frequency. On examination, she appeared well and afebrile, with tenderness noted in the right lower abdomen, particularly in the flank area, but no acute distress. Further laboratory investigation included routine blood tests, which showed normal renal function, with serum creatinine and blood urea nitrogen (BUN) levels within normal limits, indicating no evidence of renal impairment. Urinalysis revealed no abnormal findings, and a urine culture was negative for bacterial growth, ruling out a urinary tract infection as the cause of her symptoms. The patient's vital signs, including blood pressure, pulse, and temperature, were stable throughout the examination. These clinical findings, coupled with the patient's persistent symptoms, prompted imaging studies at the Radiology Department to investigate the underlying cause of her right flank pain and dysuria (3).

Imaging Findings

The ultrasound (US) revealed a complex, predominantly anechoic, cystic mass located within the right kidney. The lesion was measured at 4.5 x 3.6 cm and was located in the mesorenal area, specifically in the medial calyceal region. The cyst had a smooth, well-defined border, but internal echoes were present, suggesting the presence of two small stones within the cyst. No significant Doppler flow was detected within the cyst, which is typical for benign cystic lesions (4). The right kidney was noted to be ptotic, with a lower-than-normal position relative to the vertebral column, and the pyeloureteral junction appeared angulated (Figure 1).

The cyst is located in the mesorenal area, specifically in the medial calyceal region. Internal echoes suggest the presence of two small stones within the cyst. The right kidney is ptotic, with an angulated pyeloureteral junction, typical of benign cystic lesions, with no significant Doppler flow detected. A CT of the abdomen with contrast media was required and confirmed the presence of a complex cystic lesion in the right kidney, consistent with a pyelogenic cyst. The lesion had an expansive intrarenal development and measured 4.5 x 3.6 cm. Additionally, the patient exhibited a ptotic kidney and an angulated pyeloureteral junction (Figure 2).

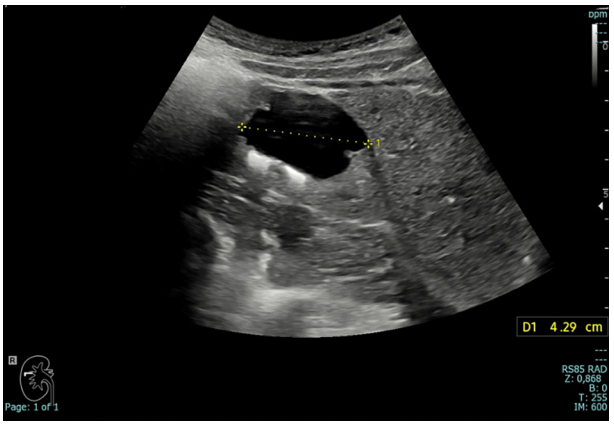

Figure 1. Ultrasound image showing a complex, predominantly anechoic cystic mass in the right kidney, measuring 4.30 cm.

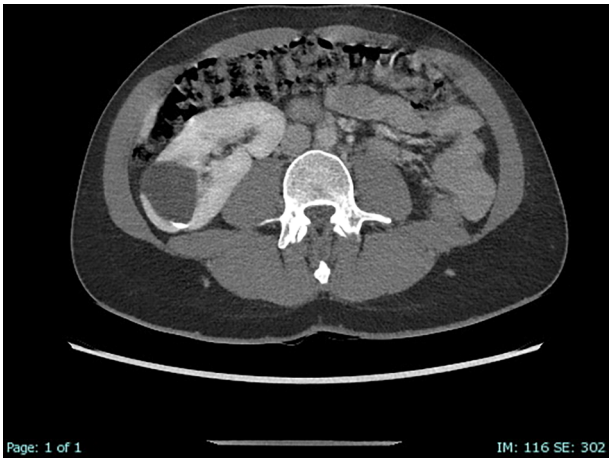

Figure 2. Axial contrast-enhanced CT image of the right kidney showing the pyelogenic cyst. The cystic lesion, measuring 4.5 x 3.6 cm, is located in the upper calyceal region with a well-defined border. The lesion is predominantly anechoic with internal echoes, suggesting the presence of two small calculi. The right kidney is noted to be ptotic, and the pyeloureteral junction appears angulated.

The cyst also contained two radiopaque stones, one larger and one smaller, which were likely contributing to the patient's symptoms. These stones were located within the cystic cavity, which is uncommon for pyelogenic cysts and adds complexity to the case. The renal pelvis appeared distended due to the ptotic kidney, and the pyeloureteral junction demonstrated an abnormal, angulated configuration, which may be contributing to the obstructive component of the patient's symptoms (5).

The remainder of the renal parenchyma showed no significant abnormalities, and the contralateral kidney was normal. After administration of contrast, the cyst communicated with the renal collecting system, showing stratification of the contrast within the cyst, which confirmed the presence of a connection with the calyceal system (Figure 3-4).

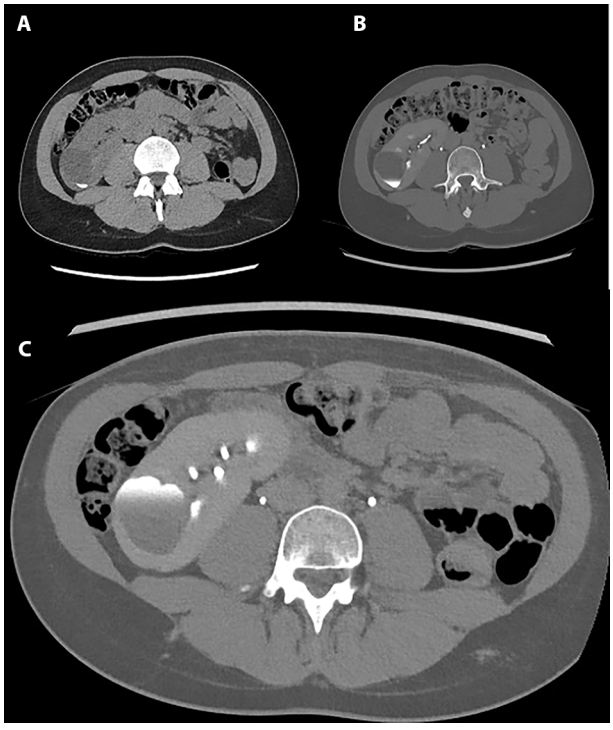

Figure 3. Contrast-enhanced axial CT images after contrast administration, showing the pyelogenic cyst in the right kidney. a) Soft tissue window, demonstrating the cyst with stratification of the contrast, confirming its communication with the renal collecting system. b) Bone window, providing a clearer view of the surrounding bony structures and the cyst's location. c) Another axial image in the bone window, further illustrating the cyst's connection with the calyceal system.

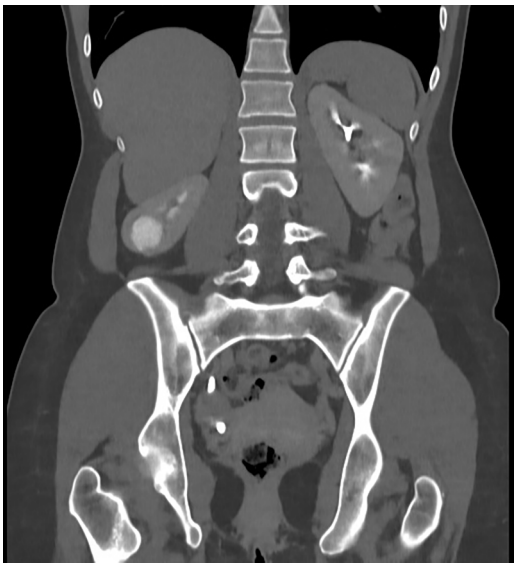

Figure 4. Coronal contrast-enhanced CT image in the bone window, showing the pyelogenic cyst in the right kidney. The cyst is clearly visualized with stratification of contrast, confirming its communication with the renal collecting system, and its anatomical relationship with the surrounding renal and bony structures.

Discussion

This case highlights a rare and complex presentation of a pyelogenic cyst in a young female patient. Pyelogenic cysts are typically benign and often asymptomatic, making their diagnosis challenging when symptomatic (6-7). In this case, the presence of two calculi within the cyst further complicates the clinical picture. The cyst's communication with the renal collecting system, as demonstrated by contrast stratification on CT, aligns with the characteristics of a calyceal diverticulum, a congenital anomaly resulting in an outpouching of the renal calyx (8-10).

Several key aspects of this case warrant attention:

- Intrarenal Development: Unlike typical pyelogenic cysts that are primarily located in the renal pelvis or calyceal regions, this cyst developed predominantly within the renal parenchyma. This suggests the presence of a calyceal diverticulum, which is a rare congenital condition characterized by a pouch-like extension from the renal calyx, often communicating with the renal collecting system.

- Communication with the Collecting System: The contrast-enhanced CT imaging revealed that the cyst communicated with the renal collecting system, a crucial finding that distinguishes this case from simple renal cysts. The presence of such communication indicates that the cyst is not a simple cystic lesion but a more complex diverticulum, further complicating the clinical management.
- Presence of Calculi: The occurrence of calculi within a pyelogenic cyst is an uncommon phenomenon and a significant complicating factor in this case. Renal calculi in a diverticulum can obstruct normal urine flow, causing symptoms such as pain, hematuria, and potentially infection if untreated. The formation of stones within the cyst increases the risk of recurrent infections, obstructive uropathy, and renal damage.

Furthermore, the patient's ptotic kidney and angulated pyeloureteral junction may predispose her to an obstructive component, which could exacerbate the risk of stone formation or recurrent infections within the diverticulum. The abnormal position of the kidney may also contribute to the cyst's development and influence its clinical presentation. As seen in this case, when symptoms such as flank pain and dysuria persist, the diverticulum may require more aggressive intervention, including potential surgical resection, to prevent further complications such as recurrent infections, stone formation, or progressive renal dysfunction (Figure 5).

In conclusion, this case underscores the complexity of diagnosing and managing a pyelogenic cyst, particularly when complicated by lithiasis. It emphasizes the importance of thorough radiological evaluation in confirming the diagnosis and determining the appropriate course of treatment. Given the potential for recurrence and further complications, a multidisciplinary approach, involving urologists and radiologists, is essential for optimal management and prevention of long-term renal impairment (11-12).

Management and Prognosis

While many pyelogenic cysts are asymptomatic and do not require treatment, complicated cases like this one with stone formation warrant a more thorough approach. In this patient, the presence of calculi within the cyst requires careful management. Conservative treatment with analgesics and monitoring may be an initial approach, but in cases where the stones cause recurrent symptoms or complications, interventions such as percutaneous drainage, shockwave lithotripsy, or even surgical resection of the diverticulum may be considered. The prognosis for pyelogenic cysts is generally favorable, especially when the lesion is benign and asymptomatic. However, in complicated cases with associated stones, careful follow-up is necessary to prevent recurrence of symptoms and potential infections (13).

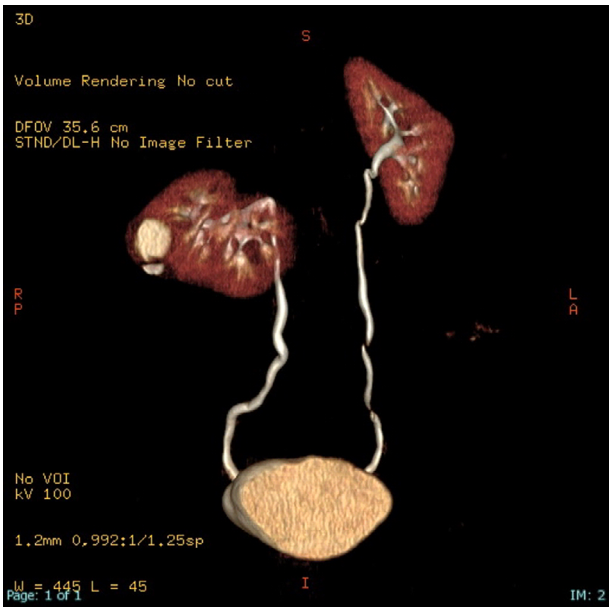

Figure 5. 3D volume rendering (VR) image of the right kidney, illustrating the pyelogenic cyst in the upper calyceal region. The cyst's connection with the renal collecting system is depicted, with clear visualization of its relationship to the ptotic kidney and the angulated pyeloureteral junction.

Conclusion

This case highlights the rarity and complexity of a pyelogenic cyst that contains calculi, presenting as a calyceal diverticulum. Radiological evaluation using ultrasound and CT imaging was crucial in confirming

the diagnosis, identifying the communication with the renal collecting system, and detecting the presence of stones within the cyst. Management of such cases requires a multidisciplinary approach, often involving urologists, to determine the most appropriate course of treatment based on the severity of symptoms and the presence of complications.

Ethics and Patient's Informed Consent: Written consent was obtained from the patient for publication of relevant medical information within the manuscript.

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Authors Contribution: The authors confirm contribution to the paper as follows: study conception and design: L.E. Author M.M. Author; data collection: G.M. and M.B., Author, F. M. Author; analysis and interpretation of results: A.S. Author, F.M. Author, L.E. Author, R.G. Author; draft manuscript preparation: M.B. Author, M.M. Author. G.G. Author. All authors reviewed the results and approved the final version of the manuscript.

Informed Consent: Informed consent was obtained.

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